Arlington Heights Citrus Landscape
Southwestern portion of the
City of Riverside
Riverside
Riverside County
California

HAER No. CA-119

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD

ARLINGTON HEIGHTS CITRUS LANDSCAPE

HAER No. CA-119

Location: Southwestern portion of the City of Riverside, Riverside, Riverside County, California

Date of Construction: ca. 1890 to present

Significance: Arlington Heights is the last vestige of the once-vast citrus culture of Riverside, California. Although other citrus groves in the region have fallen in the course of suburban development, Arlington Heights continues to support the citrus industry on which the city was founded and is all that remains of this larger landscape.

Project Information: Documentation of the Arlington Heights Citrus Landscape was completed by the Historic American Engineering Record (HAER), administered by the National Park Service, Department of the Interior, as part of the California Citrus Heritage Recording Project undertaken during summer 1991. For more information on this project refer to HAER No. CA-118 (California Citrus Heritage Recording Project, Riverside, Riverside County, California).

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I. INTRODUCTION

A. The Concept of Cultural Landscapes

The origin of the concept of landscape is from the German word ***landshaft***. ***Landshaft*** defined land that had been shaped by man, as opposed to wilderness and was a positive state. Value and order had been created out of wilderness which was viewed as evil and chaotic.[1] And, although our concepts about the relative value and worth of wilderness have evolved so that it, too, is viewed as positive, this concept of the higher state of land that has been improved by man has persisted in the development of the landscape of Southern California and, in particular, the citrus landscape.

Within the overall framework of the concept of landscapes, cultural or vernacular landscapes are those whose existence are not the result of a professional designer, but are, as J.B. Jackson said, "...simply the by-product of people working and living."[2] The cultural landscape develops as a response to man shaping the natural environment to his needs. It is a:

> geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural forces.[3]

The cultural landscape can be thought of as each generation's legacy to the next. It bears the stamp of a group of people's ideas, attitudes, and values and is a valuable reference to how people transformed ideas into form. The cultural landscape is a physical form of history, and it changes just as the people creating this entity change. Due to changes, a cultural landscape consists of many layers: the past and present; the obsolete and current. All exist together within its framework as testaments to the process of change.

B. Significance of the Arlington Heights Landscape

Historically, the citrus industry extended from Santa Barbara to San Diego. Inland, past the penetration of the ocean fog, there was a region where temperature, soil, and water combined to provide conditions ideal for citrus production. This area known as the foothill district was from Pasadena westward to San Bernardino. "This inland district, relatively frost-free, (was) the home of the winter-ripening Washington navel orange. Here the soil is largely decomposed granite, the drainage excellent, and the quality of the water superb."[4] This describes the combination of conditions that made Riverside, and Arlington Heights in particular, such an attractive area for citriculture and which resulted in the excellent reputation of navel oranges grown in this area.

Riverside at the height of its citrus industry (c.1940) contained over 12,000 acres of citrus groves. By this time citriculture had disappeared in the original "mile square" or downtown area, and except for isolated instances the groves were gone along Magnolia Avenue and the Riverside Land and Irrigating Company development. Arlington Heights and the Highgrove area (located east and northeast of the downtown) were the principal citriculture areas in Riverside.[5] Today, however, the Arlington Heights' groves are all that remains of this larger landscape. It is for this reason that this area was chosen for study and documentation by the HAER California Citrus Heritage Recording Project during the summer of 1991.

Today, the significance of Arlington Heights lies in its existence as an example of the broader Riverside citrus landscape. However, over time Arlington Heights has always represented more than just an agricultural development. It represented a way of life. It has been argued that "the single development which contributed more than any other to the image of Riverside with green belt, social elegance and English-accented manners was Arlington Heights."[6]

C. Framework for the Study of Arlington Heights

To study or evaluate any landscape and begin to understand the natural and cultural forces at work, it is necessary to examine the individual characteristics or elements that together form the whole. These characteristics can then be viewed over time to evaluate the nature of change within the landscape.

Examination of the evolution of the Arlington Heights Citrus Grove Landscape is based on a classification system devised by the National Register of Historic Places consisting of tangible evidence of the activities and habits of the people who occupied, developed, used, and shaped the land to serve human needs; they may reflect beliefs, attitudes, traditions, and values of these people.[7] These consist of both processes, such as land uses and other activities, that shape the land and physical components or artifacts, such as vegetation or buildings, that exist within or on the land.

This discussion will trace the evolution of land use within Arlington Heights from 1890 to the present and then will describe its major characteristics (spatial organization, circulation networks, vegetation, and buildings). The descriptions will focus on what existed at the height of the citrus period, during the Riverside Trust era, within Arlington Heights and what exists today.[8]

D. Boundary Definitions

Arlington Heights Boundary

The historic boundaries of the Arlington Heights Citrus Grove Landscape, as defined by the 1890 subdivision plat, were for practical purposes as follows: the eastern boundary was Arlington Avenue; on the southeast, the boundary followed the Gage Canal to Adams Street, at this point it turned southwesterly for approximately 6,000 feet, then made a ninety degree turn northwesterly and followed this line to west of Stewart Street; the boundary then made a ninety degree turn northeasterly until it intersected the Riverside Canal; on the north, the boundary followed the Riverside Canal to Arlington Avenue.[9]

This area was between the foothills and the Riverside Canal. Matthew Gage purchased this land from the Riverside Land and Irrigating Company in 1887 for seventy-five dollars per acre with the provision that payment would be made as the land was sold.[10]

Arlington Heights contained "(exclusive of streets) over 4,000 acres of watered lands."[11] By 1894, 2,000 acres had been planted in orange and lemon trees, and eventually 4,000 acres would be planted in citrus.[12]

Greenbelt Boundary

Today the boundaries of citriculture in Arlington Heights are based on the Greenbelt. In 1979, the city of Riverside designated the Riverside Arlington Heights Greenbelt. This was what remained of the historic citrus groves in Riverside. It included that part of historic Arlington Heights that was west of Washington Street and 712 feet north and parallel to Victoria Avenue. In other words, the area of Arlington Heights that had by 1979 lost its citrus groves to development was not included. In addition to the remnants of the Arlington Heights' landscape, citrus groves to the immediate west were included. These had also historically been part of the Riverside citrus landscape but had not been owned by the Riverside Trust Company.[13] The Greenbelt comprises approximately 5,000 acres of which 2,500 acres were in citrus production, in 1984.[14]

II. Arlington Heights and Its Response to Natural Features

Western Riverside County is located in the San Jacinto Basin and is made up of interior valleys and mountains. Summers are generally hot and dry, while winters are cool and moist. There are a wide range of microclimatic variations within this part of the county that affect the suitability of the land

for citriculture. On the foothills, rainfall increases while temperature and the incidence of frost vary with location. Annual rainfall ranges from 9 to 18 inches. Since citrus requires an average of 30 inches, irrigation is required to make up the deficit.[15]

Arlington Heights is located southwest of downtown Riverside between the foothills and the Riverside Canal. This land gently slopes from the foothills toward the Riverside Canal to the northwest. Slopes renge from nearly zero to 25 percent. Soils ere in the Monserate-Arlington-Exeter association and are characterized as well-drained, nearly level to moderately steep soils having a surface layer of sandy loam to loam.[16] These conditions are ideal for orange production.

Within this naturel structure, Matthew Gage envisioned the development of agricultural land based on irrigation water from the Gage Canal. The quality of the Gage Canal water is excellent and the Arlington Heights hillside location has historically provided excellent protection from frost. An 1894 promotionel brochure distributed by the Riverside Trust Company[17] spent several pages extolling the virtues of Riverside and comparing it favorably to other citrus growing regions. These conditions continue today. The quality of the Gage Canal water remains high, and the disastrous freeze of the winter of 1990-91 which decimated more northerly groves did not affect Arlington Heights whose growers received record prices for their oranges.

The majority of the groves are located below the Gage Canal allowing the irrigation water to reach the groves by gravity. The groves located at an elevation higher than the canal (on its southeast side) require pumps to bring the water to the irrigation furrows, doubling the cost of water. These fields are generally terraced to facilitate the irrigation process.

III. History of the Evolution of Land Use in Arlington Heights

The study of the history of land use in Arlington Heights can be divided into three periods. The first period, from 1890 to the beginning of World War II, was a period of significance for this landscape. It wes during this period that the visual characteristics of the landscape were formed. The second period deals with the effects of urban development pressures and how this changed the face of the landscape. This period began following World War II and continued into the 1970s. The third period, from the 1970s to the present, focuses on the evolving responses to these development pressures and the status of the groves today as a "protected" landscape.

A. History from 1890 to World War II: Height of Citriculture in Arlington Heights

In the 1880s, water determined the value of land in southern California, and Matthew Gage envisioned e real estate venture - development of agricultural land -- based on irrigation water from the Gage Canel. He began the Gage Canal with virtually no capital, and when the completion of the Canal beceme imperilled, due to under-capitalization, he obtained the funds to complete the project from a group of English investors. Thus, the Riverside Trust Company, Limited, which would create and manage the Arlington Heights Citrus Landscape from 1890 to 1928, was formed.[18]

The introduction of irrigation vie the completion of the Gage Canal in 1890 marks the beginning of the Arlington Heights citrus grove landscape. The subdivision plat for Arlington Heights was filed in July 1890 in Sen Bernardino (at that time Riverside was part of San Bernardino County). William Irving, Chief Engineer for the Gage Canal, was listed as engineer on the subdivision plat with Matthew Gage as attorney.[19]

As Gage envisioned it, Arlington Heights was a real estate development. Profits made through the sale of this land would finance the loans he had made with the Trust. However, not much land was sold end the Riverside Trust Company "became a major citrus producing firm rather than a subdivider and seller of property."[20] It is not clear if this was a deliberate plan on the Trust's part or a decision based

on poor land sales. Certainly, the brochure (c.1894) distributed by the Trust promoting citrus, Riverside, and Arlington Heights would seem to demonstrate, in the beginning, an interest in real estate promotion. The brochure contained the railway time table for the Santa Fe and Southern Pacific Railroads, cost of land in Arlington Heights and terms of payment, cost of planting a grove, general cost of living in Riverside, and success stories of Riverside grove owners.[21]

It should be noted, however, that the Trust already seemed to have viewed its involvement in the citrus industry as active and in a long-term context. In this same brochure, the Trust states that it will "prepare land for purchasers, furnish first-class trees and all other material, and take care of the grove (if so desired) in a first-class manner at the above quoted prices."[22]

William Irving, by way of a letter of recommendation in 1901 for William Ledward, described the various aspects of the Trust's involvement in the creation and management of the Arlington Heights landscape:

> During the last 11 years Mr. Ledward has been made responsible to the management...of the following works:
>
> The construction of streets... and dividing over 5,000 acres of land into blocks of about 40 acres.
>
> The laying of main pipe lines to streets to convey water from Canal to each of said blocks, and the laying of lateral pipe lines from said mains to each re-subdivision of 10 acres.
>
> The laying of flumes to each 10 acre lot.
>
> The grading and general preparation of about 4,000 acres of above lands for planting to citrus trees.
>
> The planting of all of said lands.
>
> The irrigation, cultivation and general care of all of said lands...(and),
>
> After the trees produced fruit, the additional duties of fertilization, pruning, propping, gathering of the fruit end delivering it at the packing houses.[23]

Mr. Irving, in concluding, provided this picture of early Arlington Heights:

> As our company maintained all their lands by means of their own immediate help it had to meintain a large establishment for the care of its employees, horses, and implements, and for these purposes had to provide a boarding house, bunk-rooms, stables, barns, smith shop, carpenter-shop, harness-shop, and store-rooms.[24]

By 1902, the Trust, under the banner of the Arlington Heights Fruit Company, had three work camps and two packing houses.[25] Management of the groves was divided into three sections with a foreman in charge of each: the Lower Section was under the control of Balmoral Camp, located at Victoria Avenue end McAllister Street; the Middle Section was under the control of Windsor Camp, located between Gratton and Monroe Streets on the south side of Dufferin Avenue; and the Upper Section was under control of what was known es the Osborne Camp, located off Dufferin Avenue on Grace (Evans)

Street.[26] The Prenda Packing House was located on Dufferin Avenue at Madison Street and there were operations located in two buildings at Arlington Station.[27]

In 1907, the Trust had 5,734 acres of citrus groves of which 4,000 acres were planted in oranges and 1,000 acres in lemons. Planting wes still continuing, and land not in citrus production was planted with hay or grains to provide feed for the large number of horses and mules. There were 175 men employed in the planting and production of crops and 125 in the packing department. This did not include the seasonal labor used at harvest time, both in the fields and the packing houses.[28] Washington naval oranges were the predominant cash crop, although valencia oranges, lemons, grapefruit, avocados, and walnuts were also grown in Arlington Heights.[29]

In 1928, the Riverside Trust Company, Limited wes dissolved and its assets liquidated. Within a few months, the entire acreage of Arlington Heights was sold. Many of the buyers were from Riverside, already in the citrus business, and many had been employed by the Trust.[30] Following the dissolution of the Trust, citrus remained the primary focus of land use, and Arlington Heights continued to look much the same as it had under the English trust company.

From 1920 until the beginning of World War II, the citrus industry continued to increase production. This was due to increases in production per acre rather than to increases in the acreage devoted to citrus.[31] Prior to World War II, most of the land in Arlington Heights was in citrus production.[32]

B. World War II to the 1970s: Urban Development Pressures

Following World War II, the pressures to convert citrus land to other uses, mainly suburban housing, increased dramatically. Citrus remained the primary land use until development pressures increased land prices to the point that selling the groves became more profitable than growing oranges.

The California 91 Freeway connected Riverside to Orange County in the early 1960s and shortened the relative distance to Los Angeles by shortening commuting time. Riverside was then considered an alternative for housing for people working in Los Angeles. The City was in the path of the expanding sprawl of greater Los Angeles, and since then the pressures to convert land to suburban housing have dramatically increesed.

This process of change was evident in Arlington Heights by the early 1960s. The pressures of increasing land values and the subsequent rise in property taxes worked at altering the face Arlington Heights. The community was elready discussing how to control development and what its effects would be on citriculture. A 1963 newspaper article aptly titled "Taxes doom pride of Riverside: its groves" quoted one grower es saying that the green belt should be "good for another 20 years" of citrus growing.[33] His prediction would probably have been prophetic had it not been for grassroots concern within the community for both the overwhelming scale of development and desire to maintain the historic heritage that citriculture represented. There was the acceptance that the disappearance of citrus would eliminate e major element of Riverside's collective identity.

From 1966 to 1968, Riverside's City Planning Commission prepared e city-wide master plan to direct Riverside's growth into 1990s.[34] It posed the challenge thet faced Riverside:

> Riverside hes en inheritance to loose, and there is a clear end present danger of losing it...Not by identifiable villains but simply by growth. Can inevitable change be directed to preserve what is good and to create new values?[35]

The citizens of Riverside would deal with this question over the next fifteen years, as they defined planning controls in Arlington Heights.

A 1,100-acre Arlington Heights Park was proposed in 1967. The park would have included Mockingbird Reservoir and the grove area between Van Buren Boulevard to Monroe Street bounded by Victoria Avenue. This park was seen as Riverside's equivalent to Balboa Park in San Diego. It would provide "attractions typically found in large urban parks such as a zoo, golf course, tennis courts, children's storyland, music concourse, and riding stables."[36] The park did not become a reality. Property owners were not, at this point, ready to sell and relinquish control of their land. The focus of this plan wes to enhance the quality of new development. It made no attempts to control it. At this point, the groves were seen as but one of many amenities the park would provide. The next decade witnessed a growing awareness of the value of the groves as the primary resource and a evolution of the methods used to protect them.

C. 1979 to the Present: The Protected Landscape

The balancing of development against citriculture in the Arlington Heights Citrus Landscape has been an ongoing issue. From its beginning in 1890, Arlington Heights hes seen aspects of real estate development and speculation. However, the rapid conversion of groves into housing over the last 30 years has been at a pace and scale that is perceived as a threat to the identity of Arlington Heights.

In the late 1970s, several initiatives were placed on the local ballots to deal with development pressures in Arlington Heights. These would eventually deal with the status of the groves. Measure B (Initiative Ordinance to Rezone Property, Amend General Plan and Temporarily Condition Issuance of Residential Building Permits) was the first of these initiatives and created a firestorm of controversy within the community. It was labeled as a "growth control initiative" and would have placed portions of Arlington Heights into a new agricultural zone with minimum lots of four and three-quarters acre. It was narrowly defeated in the November 1977 election.[37]

Support for some type of control continued to grow, and, in 1979, Proposition R ("Taxpayers' Initiative Ordinance to Reduce Costly Urban sprawl by Preserving Riverside's Citrus and Agricultural Lands, Its Unique Hills, Arroyos, and Victoria Avenue") was adopted. This legislation defined the boundaries of the Greenbelt and limited density to one structure per five acres. It had the backing of two groups of people who had two different concerns: one, those who wanted to control the density of development in the Greenbelt and prevent the type of development that had already occurred in Orange County and would soon occur in Moreno Valley; and, those who were concerned with the disappearance of the citrus groves. Proposition R nominelly recognized the citrus landscape in its title, but addressed its controls to density issues. There were no incentives or means to preserve or protect the groves.[38]

In 1982, the California Citrus State Historic Park was established in Riverside on a site in Arlington Heights adjoining Mockingbird Dam.[39] The location of the park in Riverside was in part a recognition and "vote of confidence" concerning the continuing presence of citriculture and viability of this cultural landscape unit.

The city, in its efforts to follow the mandate expressed by citizens through Proposition R, commissioned a study in the mid-1980s that incorporated the preservetion of citriculture end the grove landscape. It provided a baseline of information on the status of citriculture and included an economic survey of citriculture in the Greenbelt, analysis of the status of grove conditions, and survey of landowners' ettitudes. The study's goals were to reduce urban sprawl and preserve civic amenities, the objectives of Proposition R. This study illustrated the evolution of planning and preservation in Arlington Heights. It acknowledged the value of the natural landscape as well as citrus groves. In addition, Victoria Avenue was identified as a symbol of Arlington Heights. The plan proposed several alternatives for achieving its goals and assessed their impact on the resource -- the citrus groves. Preservation and development zones were proposed to control density while also protecting and

preserving the mass of groves. This plan promoted the idea that the collective whole was what was most valuable.[40]

Proposition R had been a beginning, but it basically was e recognition of the value citizens placed on Arlington Heights. It provided no real protection for the groves and was amendable by the city council, thus subjecting the legislation to political pressures. In the November 1987 election, two initiatives were placed on the ballot that further refined Proposition R. Measure G (An Ordinance to Preserve, Protect, and Enhance the Quality of Life of the Citizens of the City of Riverside Through Comprehensive Growth Management Plans, General Plan, Amendments, and land Preservation Plans) was sponsored by the city and focused on management plans as proposed by the studies that had just been completed. Measure C (Citizens' Rights Initiative to Reduce Costly Urban Sprawl, to Reduce Traffic Congestion, To Minimize Utility rate Increases, and to Facilitate Preservation of Riverside's Citrus and Agricultural Landscapes, its scenic Hills, Ridgelines, Arroyos, and Wildlife Areas) was citizen-sponsored. Measure C won by a very small margin. It retained 5-acre lot as the means for controlling density; provided for funds to replant dying groves and/or vacant land; and removed the city council's power to amend the ordinance.[41]

A citizens Ad Hoc Committee made the following observations in its 1987 recommendations to the Arlington Heights Greenbelt Study:

> The Greenbelt is unlikely to survive over the long term if the present 5 acre zoning is left unchanged. This is primarily because economically viable citriculture requires much larger parcels than 5 acres. Moreover, because the land will always be more economically valuable for residential development than for citriculture, it can be expected that there will be constant and increasing pressure for development. . .The most realistic way to insure preservation of the historic citrus area within the Greenbelt is through public ownership. . .Citriculture is viable and likely to remain so for the foreseeable future, under the following conditions: professionally farmed, large parcels, adequate tree replacement, and grove is not expected to produce a return on investment based upon subdivision land values.[42]

The Wildlife, Coastal, and Park Land Conservation Bond Act of 1988, known as Proposition 70, granted Riverside $10,000,000 to buy land adjacent to the new state park. This was a beginning for public ownership. The city will lease this land to growers and use the proceeds to purchase more land.[43]

Searching for ways to encourage remaining citrus growers to stay in business and to resist the pressures to sell their land, the city has placed the land within the Greenbelt under the Williamson Act program. This program provides a means of reducing property taxes on farm lands in return for restrictions on its development. It is a voluntary program under which citrus groves ere assessed eccording to the income they produce rather than et the market value of the land. However, grove owners must commit to an initial 10-year term end ten acres is the minimum area that qualifies.[44]

Today, the struggle to define end protect the Arlington Heights landscape continues. Several cases are before the California State Supreme Court filed by landowners challenging the city's right to limit the density of development to one structure per five acres. The area north of Victoria Avenue has been almost totally developed, and the continuity of the groves south of Victoria Avenue, once e charecteristic of the landscape, has been disrupted by a variety of new land uses: individual homes on 5 acres lots, horse ranches, ornamental plant nurseries, and truck farms.

As Arlington Heights enters its second century, the cultural landscape continues to evolve. Today, it is valued as both a symbol of the city and as a gauge for the quality of life. As the grove landscape is viewed more and more as a record of Riverside's heritage, its value as a tourist attraction has developed.[45] This new use will impact the characteristics of the landscape and provide the next chapter in its history.

IV. Description of the Arlington Heights Citrus Grove Landscape

A. Patterns of Spatial Organization

The Gage Canal established a framework for the spatial organization of the Arlington Heights landscape.[46] From the location of the Canal developed the series of grids formed by the groves and roads that give structure to the Arlington Heights cultural landscape. The layout of this pattern was a pragmatic, functional response to the terrain, engineering requirements of the Gage Canal, and a need to bring water to as much land as easily as possible. Most of the groves are located to the north of the canal to deliver water by gravity. Each block of land is 40 acres and was subdivided into 10 acre groves.

The grid pattern is visible from higher vantage points along the ridge of the hillside and from the canal. This pattern is also evident on the ground when one is driving down a street through the groves. The grid is less apparent north of Victoria Avenue. The addition of new roads to accommodate new housing developments, many of them cul de sacs, bear no relationship to the original grid system.

Within the grove and road pattern, a linear pattern emerges. Palms (Mexican fan, California fan, and date palms) as well as other trees were planted along many of the major grove streets providing a linear quality to the visual scene. The mature palms tower over the uniform landscape of the groves, delineating streets and providing a visual clue to the order of the landscape. The linear quality also extends into the groves with the rows of orange trees and the irrigation furrows.

Victoria Avenue also provides a linear visual scene within the landscape. This eight-mile-long boulevard is the main road through Arlington Heights. It is particularly important, since most people experience the Arlington Heights landscape as they drive down this boulevard. Victoria Avenue's linearity is reinforced through its planting design. Tall Mexican fan palms are planted in a single row on either side of the center island for most of the length of the avenue. Historically, dense groves lined both sides of Victoria Avenue and limited the view to the corridor of the avenue.

The spatial patterns of the groves and roads are expressions of a highly structured and controlled landscape. This structure and control extended into the individual grove where straight irrigation furrows provided life-giving water to the orange trees at prescribed times and in predetermined amounts. Even weeds were not allowed to invade the groves due to the accepted practice of tilling. The landscape of citriculture is an expression of the scientific attitude applied to growing oranges. It is also a revelation of the mind-set growers applied in controlling all aspects of the citrus industry through the development of cooperatives, such as Sunkist. If a landscape bears the stamp of its creators' ideas, attitudes, and values, then the highly manipulated order and control of a monoculture landscape such as Arlington Heights is an accurate physical record of California citrus in general and the Riverside Trust Company in particular.[47]

B. Circulation Networks

There were two types of circulation networks in the Arlington Heights grove landscape. One, the street system is still intact and serving its original purpose. The other, the railroad, is more a memory since it no longer relates directly to the groves.

Railroads
The Atchison, Topeka, and Santa Fe Railroad's main line passed north the Arlington Heights along Indiana Avenue. There were packing houses concentrated at Arlington Station and Pachappa Station. The line is still active, although the packing houses are no longer extant. At one time there was a spur line to the Prenda Lemon House, at Dufferin Avenue and Monroe Street.

Streets
The street system served two functions. It was an agricultural network that allowed equipment and workers into the groves and provided e means to transport the field boxes of oranges to the packing houses. And, it served as a transportation network for residents within the grove landscape connecting them to Riverside. Basically, the road system still serves the same functions today as it did historically.

The layout of the roads were perpendicular and parallel to the canal. Every other perpendicular road connected to the existing "President" street system that was part of the Magnolia Avenue development in 1875. Between these were added new roads, so that the roads were 40 acres apart. These new streets were named after members of the Gage and Irving families.[48] The parallel streets were placed in response to the perpendicular streets to create the 40-acre grove block.

The original roadway layout as found on the 1890 subdivision plan is still in place in the grove area. However, subdivision development has brought with it new roads. The original streets serve as connectors or secondary roads and within these are the local subdivision roads. Many of these roads are cul de sacs or are not through roads. They do not necessarily connect conceptually or physically to the original street layout.

The perpendicular roads are called streets, starting with Arlington Street and moving generally westward, they are: Horace, Maude, Mary, Washington, Madison, Grace, Jefferson, Adams, Gratton, Monroe, Irving, Jackson, Gibson, Harrison, John, McAllsiter, and Stewart streets. Van Buren Boulevard has developed into a major connector and falls between Gibson end Harrison Streets. Parallel roads are called avenues and consist of the following: Dufferin, Cleveland, Victoria, Lincoln, and Indiana avenues.

Victoria Avenue
Description
Victoria Avenue is the main street through Arlington Heights and served as both a park and drive. This linear corridor presented the ideal rural citrus scene, with dense green citrus groves providing the border along the drive. It was described in 1894 in this way:

> Through the center of Arlington Heights, 6 miles, runs Victoria avenue, a magnificent double roadway 120 feet wide, and running most of the distance parallel with the famous Magnolia avenue, which is located lower down the valley. In a drive out over one of these avenues and back by the other, the tourist makes a circuit of many miles, that, for greteful shade one way, and beauty and grandeur of scenery the other, is hardly approached in any land.[49]

Grading on Victoria Avenue began in the spring of 1892[50] and planting was supervised by Franz Hosp in the same year[51]. The boulevard began et Myrtle Street and continuing through the orange groves of Arlington Heights where it ended at the city's eastern boundary. It was a two-laned boulevard; 120 feet wide; originally unpaved with each treffic lene from 18 to 20 feet wide; and the center planting island was 36 feet wide. The total cost of grading the avenue and building the original wooden Victoria Bridge was $25,000.[52]

There were originally no right-of-ways along Victoria Avenue and lots went to the edge of the street. Property owners were required by deed restrictions to plant their section of the avenue, water, and maintain it. If they did not, the trust would do so and charge them accordingly.[53] The southeast lane of the avenue was paved in the 1920s (the other lane was paved in the late 1940s), and, although there was room in the center island for a street rail line, it was never laid down Victoria Avenue.[54]

The Mexican fan palm was planted in a double row down the center. Beneath these tall, stately trees, rows of Ragged Robin Roses, Gloire des Rosomanes, were planted. This old-fashioned red rose is today associated with Victoria Avenue and is propagated by the Riverside Parks Department for planting in Arlington Heights. Also, planted in the center of the island were a variety of tree roses, crepe myrtles, and other flowering shrubs. Along the outside of the roadway, on both sides, were planted a row of trees. These varied within groups of blocks but typically included Brazilian Peppers, rough barked eucalyptus, and a variety of palms.[55]

C. E. Rumsey was responsible for planting the Mexican Fan palms that are now such a part of Victoria Avenue's character. He raised the palms from seed and with the help of two of his employees, Milford Thomas and "Charlie" Yamaquchi, and under the supervision of Franz Hosp, transplanted the trees to their current location. He was also instrumental in the selection and installation of other plantings.[56]

Development
In 1900, the Trust deeded the avenue to the city with the stipulation that the trees be protected and the street maintained.[57] Early concerns centered on the level of maintenance that the city provided for the boulevard. In 1924, a group of women in Arlington Heights were already campaigning against the cutting of shade trees and for the "preservation of the beauty of Victoria avenue."[58]

Victoria Avenue's dual identity as both a thoroughfara and a park is the source of much of the controversy surrounding its evolution through the years. It was designated as a "parkway" by the city in 1927 (although the exact nature of this designation is not clear).[59] As the Arlington Heights area developed and traffic increased, there were increased pressures to bring Victoria Avenue in line with modern engineering standards. But standardizing and widening the road, providing turning and deceleration lanes, curb and gutters, and lights were at odds with its visual character.

In 1963, there was a proposal to "protect Victoria Avenue's scenic beauty from encroachment" by dedicating the entire length as a city park.[60] In June 1969 the city of Riverside's Cultural Heritage Board declared the avenue the eighth Cultural Heritage Landmark.[61] To try to cope with ever-increasing pressures on the avenue, the city prepared "A Plan for the Development of Victoria Avenue" in 1971.[62] This volume addressed issues of traffic and volume, right-of-way, and treatments of the frontage. It acknowledged the existence of an image and streetscape that were characteristic of Victoria Avenue.

However, the setting of Victoria Avenue is also a part of this image and streetscape, and the orange groves that bounded the length of Victoria Avenue have been replaced with suburban development. This change has not been without bitter fights from various citizen's groups. Victoria Avenue was the focus of concern long before any threat was perceived to the total Arlington Heights cultural landscape. It is along Victoria Avenue that the creeping changes brought about by suburban development were first perceived.[63]

Today, only a few blocks, from Grace to Gratton Streets, still retain tha historic streatscape with groves on both sides of the avenue. When development takes place, replacing groves, a 30-foot right-of-way must be dedicated to the city. In a few places, a double or triple row of orange trees has been planted in the right-of-way to maintain a reference to an earlier period. However, more often the right-

of-way contains grass and shrubs and lacks any specific meaning to Victoria's history. This treatment widens the view along the avenue and the historic nature of the narrow streetscape bounded by orange groves is then lost. It becomes just another pretty street.

Influences on the Development of Victoria Avenue

Victoria Avenue was probably a direct result of the success of Magnolia Avenue located approximately one and a quarter miles to the north. In the late-nineteenth and early-twentieth centuries, Magnolia Avenue had a reputation as one of the most beautiful streets in southern California. It was laid out in 1875 by the Riverside Land and Irrigation Company with a 132-foot width, 20-foot-wide sidewalks on each side, a 10-foot center planting island, and two lanes, each 41 feet wide. Cross streets, 80 feet wide, were laid out every half mile. These were named for the presidents beginning with Washington.[64] A center row of pepper trees was planted by the developers. The developers offered to share the expense of planting the avenue with the private land owners whose property faced Magnolia Avenue, establishing a practice that would be followed on Victoria Avenue. The agreement between the developers and the landowners stipulated that:

> They (Riverside Land and Irrigating Company) offered to pay one-third of the expense of grading and the purchase and planting of three rows of trees, and the care of them one year, an to furnish water for irrigation free, provided the landowners on each side would pay one third in proportion to their ownership of frontage. The proposition was at one accepted with the result so much admired and praised.[65]

Within a larger context, Victoria Avenue was part of the development of boulevards nationwide. Local lore maintains Magnolia Avenue was the earliest boulevard in America. While this claim has not been substantiated, the development of both Magnolia Avenue (c. 1875) and Victoria Avenue (c. 1891) make them very early examples of residential boulevards in America.

The design of residential boulevards was heavily influenced by the work of Frederick Olmsted and Calvert Vaux. In their second plan for Prospect Park (c. 1868), they proposed a boulevard system that was an evolution of the European connector boulevard which combined the elements of a park, park drive, park footpath, and residential-connector street. In this case it was a part of a residential development.[66] This concept describes both Magnolia and Victoria Avenues.

Significance

Victoria Avenue is significant for several reasons. This boulevard typified the landscape image of citrus in southern California. It continues to be viewed as a "symbol of Riverside. . . , as an example of the best of early southern California development."[67] It is also an important example of residential boulevards during the late-nineteenth century. Finally, it illustrates the breadth of Matthew Gage's vision for the development of Arlington Heights.

Hawarden Drive

Hawarden Drive winds along the base of the hillside from Arlington Avenue and dead-ends approximately one quarter mile west of Horace Street. Along this narrow street remain the "vestiges of an affluent rural past in Riverside."[68] William Irving envisioned Hawarden Drive as the setting for a development of prestigious, stately homes.[69] The drive was the location of the homes of several members of the Mylne and Irving families as well as other early citrus growers. These homes had a commanding view of the groves below and the mountains in the distance.

Today, the majority of the groves on the lower side of Hawarden Drive have been replaced with suburban homes. However, several of the estate homes from the Riverside Trust era remain: La Atalyaya (c.1913), the William Porter house at 5800 Hawarden Drive; Edgemont (c.1900), the John

Henderson house at 6116 Hawarden Drive; Greystones (c.1901), the John Mylne house at 6190 Hawarden Drive; Orchard House (c.1916), the Norman Irving house at 6499 Hawarden Drive; and Raeburn Place (c.1896), the William Irving house at 2508 Raeburn Drive.[70] Also the basic character of the road has survived. The street is only about 17 feet wide as it winds along the hillside. There still remain stately examples of the date palms and cypress that once lined the lower side of the drive. In the early 1960s and again in the mid 1970s, consideration was given to widening the road and adding lights, curbs and gutters, and sidewalks. This was not done and Hawarden Drive and its foothills are recognized by the city as "...among Riverside's most unique and interesting locales."[71]

C. Citrus Estates

Within the cultural landscape of Arlington Heights are several elements that were designed with a conscious plan. Victoria Avenue has previously been discussed. The citrus estates of the grove owners are the second component of the designed landscape within Arlington Heights. Two regional influences should be mentioned to place the ideas that shaped Victoria Avenue and the citrus estates within a regional context. One was the Canyon Crest gardens and development in Redlands, a neighboring citrus community, and the other the work of Franz Hosp.

Canyon Crest

Canyon Crest was the home of the Smiley Twins, Alfred H. and Albert K. Their 200-acre development along the crest of the hills of Redlands contained over five miles of curving drives bordered by rare trees and shrubs. The vistas from these roadways were carefully developed parts of the landscape. It was renowned with special tourists trains made the stop at Canyon Crest during the years it was open to the public, 1889-1936. Canyon Crest probably provided the model for William Irving's vision of Hawarden Drive.

Franz Hosp designed many of the plantings in Canyon Crest and secured the exotic plant materials. He was recommended to William Irving by the Smileys as "...the best landscape architect in the whole region. He was invaluable to us in designing and planting our park."[72]

Franz Hosp

Franz Philip Hosp came from Germany to New York City in the 1870s at the age of 19. It is not certain if he had formal training in horticulture but his first employment in New York was for his cousin William Fisher as an assistant in landscaping Central Park. This experience must have influenced his later work. He went on to develop florist businesses in New York City and Cincinnati before coming to Riverside in 1886. His experience and influence in the design of public and private spaces in Riverside during the late-nineteenth and early-twentieth centuries was significant.[73]

For 17 years, Hosp was superintendent of parks for the Santa Fe Railroad and laid out the grounds for stations from San Francisco to San Diego and east to Albuquerque, New Mexico. He designed end planted the gardens of the El Tovar Hotel in the Grand Canyon.[74]

Franz Hosp was a major force in shaping the landscape esthetic of Riverside and Arlington Heights. He directed the earliest plantings of Victoria Avenue and guided its development through the years. In addition to this considerable contribution to the public image of Arlington Heights, he was responsible for the design of the grounds of many of the grove owners and elite citizens of Arlington Heights and Riverside.[75]

Citrus Estates

The placement of grove owners' homes at prominent points along the hillsides was a characteristic settlement pattern of this landscape. The owners could in effect look down over all they owned and controlled. They developed elaborate homes surrounded by Victorian gardens. These became islands

of prestige and were intended to provide an appropriate setting and stage for the gracious lifestyle of the citrus growers.

Architecture
The homes of the citrus owners located in Arlington Heights exhibit a wide range of styles. However, houses built during the height of the Riverside Trust era reflect the influence of "the English colony". Later homes would show more Mediterranean and California-influenced characteristics. For excellent descriptions of the history and stylistic characteristics of these homes refer to Adobes, Bungalows, and Mansions of Riverside, California.[76]

Gardens
Very little evidence remains of these gardens. Within individual gardens, there may remain the isolated tree as an example of the types of plant materials used. The gardens reflected the predominate tastes of the era end tended to be horticultural showplaces displacing the incredible range of plant materials. Fortunately, there ere excellent contemporery sources that provide descriptions of the these gardens. In the 1920s and 1930s, A.D. Shamel wrote a series for the California Citrograph[77], a periodical catering to citrus owners, describing several Riverside estates and defending the character of the growers by expounding on their taste and sense of aesthetics:

> "...the tasteful and harmonious surroundings of the many country homes and orchards in the citrus districts indicate that a keen appreciation for the beautiful is not inconsistent with commercial success in orange growing and that such instincts are possessed and expressed to an unusual degree by the orange growers."[78]

D. Vegetation
Oranges
The Washington navel orange is a member of the Citrus family. Oranges are evergreens and the Washington navel grows 20 to 25 feet tall and has a globular form. It bears fruit from December to February.[79]

The Valencia orange is the "juice-orange of stores," and is the most widely planted orange in the world. Its fruit metures in the summer. The trees are generally taller and fuller than the Washington navel.[80]

Trees
There are a very wide range of ornamental plantings found in Arlington Heights.[81] However, there are a few plants whose form and character have come to be associated with landscape. The street trees are the most obvious exemple in Arlington Heights. Victoria Avenue, Dufferin Avenue, and Raeburn Place are examples of roads within Arlington Heights that retein enough of their trees to illustrate the historic intent of the street tree planting designs. Many of the grove "streets" contain examples of the street plantings that may run for a block or more. The trees are mature specimens and have a grander scale than would have been experienced during the Riverside Trust era. Only along Victoria Avenue have new trees been planted to replace those that have been lost, and in doing so continue this very characteristic element of the streetscape.

The palm trees are the most drametic species used in the street tree plantings. Three types of palms dominate the street tree plantings: the Mexican fan palm (Washingtonia robusta), the California fan palm (Washingtonia filifera), end the date palm (Phoenix dactylifera).

The eucalyptus (several species of eucalyptus are found but Eucalyptus leucoxylon, white ironbark is the most common) and pepper tree (the California Pepper tree, Schinus molle, has pendulous form and

the Brazilian Pepper, S. terebinthifolius has an upright form) were two exotic species that were planted in abundance. The older specimens of these trees take lend a very picturesque image to Victoria and Dufferin Avenues, two places they are found.

The Italian cypress (Cupressus semprvirens), with its stately columnar form, was used to line streets, driveways, and denote the edge of properties. It can be found in isolated instances along many streets, but Hawarden Drive and Dufferin Avenue provide two good examples. This tree, native to southern Europe, provided a definite Mediterranean character to the landscape.

Shrubs

Both the historic and current landscape contain a profusion of colors, scents, textures, and forms provided by the many and varied plants placed within the landscape by man. Oleanders (Nerium oleander) appear in many historic photographs along the grove streets as borders or screens or as boundary demarcations. They can still be seen today with their abundance of blooms in white, red, and various shades of pink.

The ragged robin rose (Rosa chinensis 'Gloire de Rosomanes') has come to be associated with Victoria Avenue. They are planted as a hedge in a double row down the center planting island for much of the length of the boulevard. This is an old-fashioned type rose with a semi-double, red, fragrant flower. It is propagated by the city of Riverside Parks Department for use along Victoria Avenue.

E. Buildings

Buildings illustrate the layers that coexist within a landscapes. New and old buildings are often side-by-side. Some are adapted to meet new needs and some simply exist as reminders of previous times. The following descriptions are examples of the various types of buildings found in Arlington Heights.[82]

Work Camps

Behind all the symbolism of the citrus culture in Southern California remains the fact that Citrus was an agricultural commodity managed for profit. As is the case with most labor-intensive agriculture, the ownership and decision making are separated from the labor. This separation can be seen in the landscape.

The Arlington Heights citrus groves were highly structured with a definite social order. The owners homes were separated from those of the labor and from the structures associated with the work of a citrus grove. The workers were housed in work camps that were owned and controlled by the Trust. During the height of citriculture in Arlington Heights, there were four work camps. None of these remain today.[83]

Balmoral Camp

The Balmoral Camp was the southern-most work camp. It was located on McAllister Street just south of Victoria Avenue. Based on the Riverside Sanborn Map[84] of 1908, the camp was rectangular, 275 feet by 175 feet. The front or west side of the camp faced McAllister Street. Victoria Avenue was to the north, with "gardens" located between the buildings and Victoria Avenue. Orange groves bordered the camp on the east and south sides.

There were three main structures. On the northwest corner, facing McAllister Street, was a building that appears to have been the living quarters and dining hall. On the southwest corner, facing McAllister Street, was another structure labeled "wagon shed" end "hay shed" suggesting the use of horses or mules in the groves. Between the living quarters and the wagon/hay shed, at the back or east side was a "corral" with attached sheds. There were several smaller buildings. One, located on the northeast corner, wes a two-room structure labeled "shed". The other two were located on the

southeast corner end were not labeled. There was also a one-room and a two-room structure.[85] Nothing remains of this camp today; it is the site of a housing development.

Windsor Cemp

Windsor Camp was located between Gratton and Monroe Streets on the south side of Dufferin Avenue. It was the last of the three original camps to be built (c. 1900).[86] The layout of this camp was linear. There was a central "driveway" at the end of which was a building that housed the office and dining hall. On the east side of this drive was a row of work buildings with eight sections. Five of the eight sections are labeled: "hay", "buggy house", "storage", "repair shop", and "wagon shed". West of the drive, next to Dufferin Avenue, was the front of the cemp and the location of the workers' housing. Shown on the Sanborn map ere e "boarding house", surrounded by four, one-room buildings. One was lebeled "bunk house", two were simply labeled "room" end one was unlabeled. Across the street on the north side of Dufferin was a "corral" and enclosure for hay.[87] Today, the building that contained the office and dining hall remain and is a private residence.[88] To the east of the house, there remains what may be a portion of the original row of work sheds.

Osborne Camp

The Osborne Camp was located south of Dufferin Avenue on the east side of Grace (formerly Evans) Street next to the Gage Canal. This was the largest of the three original camps. The camp was laid out in e rectangle 300 feet across the front (Grace Street) by 525 feet along the canal. Grace Street was on the west side, the Gage canal on the south. There were orange groves on the east and north sides. The camp was divided into two sections; at the front were the office and living quarters, and at the back was a stable yard surrounded by work buildings.[89]

The front section was dominated by a large "garden" which was surrounded by a hedge. The "foreman's sleeping room and office" was located on Grece Street at the western corner of the garden. A row of buildings containing the dining room and sleeping areas was located to the west of the garden.[90]

The back section was structured around the "stable yard". There were rows of buildings on all four sides of the stable yard, labeled as follows: "Plumbing and Cement Storage", "Wash Room", "Tool Room", "Hay Storage", "Painting", "Harness", "Wagon Shop", "Blacksmith", "Wagon Shed", and "Bunk House." Behind this area, to the northeast, were two structures; one for "hay storage", the other was e "corral".[91] Today, in this location is a grove and private residence.

Martinez Camp

There was apparently another work camp in Arlington Heights bordered by Victoria and Cleveland Avenues between Irving and Jackson Streets. Martinez Camp dates from c.1911 and housed Mexican and Japanese workers. No information on this camp appeared on the 1908 Sanborn map; the camp posted-dated available editions of the Sanborn maps. However, several residents recorded their recollections of this camp in an interview with a local historian.[92] Originally the camp had been exclusively for Japanese workers, but c.1911, a section was added for Mexican workers. The two areas were separated by a "high board fence." During the late 1910s, there were as many as 450 men in the camp. Today, this is the location of groves.

Packing Houses

Prenda Packing House

The Prenda Pecking House of the Arlington Heights Fruit Company was located on Dufferin Avenue at Madison Street. An Atchison, Topeka, and Santa Fe Railroad spur line ran to this packing house which was used for curing and packing lemons. It contained two sections: the north end was a "lemon curing" building seperated from the packing area by a drive; the packing building contained seven

rooms labeled "lemon washing", "sweat room", "packing", "box and snook storage and nailing", two unlabeled packing rooms, and a small "office." The rail spur and platform were on the east side the building next to Dufferin Avenue.[93]

On the western side of the packing house were a group of buildings that were probably a work camp. These were laid out in a line parallel to the packing house at a distance of 50 to 100 feet. On the northernmost end was a "Chinese Bunk House" with a "kitchen" to the west in a separate building. Approximately 150 feet to the south was a "horse shed". Two hundred feet south the horse shed was a dining hall, with a "boarding house" 80 feet to the south. Thirty feet to the south of the boarding house was a row of five buildings labeled "Japanese Shacks." Two buildings, probably living quarters, were located about 30 feet to the west of the boarding house.[94] During this period, the Japanese were the predominant minority employed in the packing houses[95], so these buildings probably housed workers for the Prenda Packing house. The Prenda Packing House burned in 197? and all that remains are the concrete foundations of the basement. There is no evidence of the workers' housing.

Packing Houses at Arlington Station
The Arlington Heights Fruit Company had an orange packing house and a lemon curing and packing house at Arlington Station on Van Buren Boulevard. The orange packing house was located on the south side of the Atchison, Topeka, and Santa Fe Railroad line directly across from the Arlington Rail Station. The lemon house was located on the north side of the tracks on the corner of Van Buren Boulevard and Indiana Avenue. The orange house, 125 feet by 80 feet, was divided into two sections. The lemon house, 100 feet by 100 feet, had only one large room. There was a group of packing houses located along the rail line at Arlington Station (Randolph Fruit Company's Packing House, San Jacinto Packing House, and California Citrus Union Packing House No. 38) none of which remain today.[96]

D. Miscellaneous Buildings and Structures
Victoria School was built by the Trust in 1892 at a cost of over $10,000. It had the capacity for 250 pupils and was located on Victoria Avenue and St. Lawrence Street. It was attended by children from the Mexican and Japanese work camps, Chinese and Mexicen children living in Casa Blanca, and children of anglo families in Arlington Heights. The school no longer exists.[97]

Today, there are scattered buildings and structures remaining from the height of the citrus grove period.[98] These include a barn on Dufferin Avenue at Praed Street thet was owned by the San Jacinto Land Company (1890s to 1940s). This was "the other English Company," which operated the groves south of the Trust operations.[99]

Several houses that were probably for managers of the citrus operations remain. These are generally two-story, frame buildings. Also remaining are examples of what were probably foremans' homes and/or offices. These are generally one-story frame structures. Finally, there are isolated examples of small, generally one-room work buildings. Many of these structures have had additions and modifications to them.

Several oil tanks remain as reminders of the days of smudge pots. Behind the Gage Canal Office, at Dufferin Avenue and Kitchen Street, are two tanks that were owned by the Arlington Heights Protection Association. These tanks provided fuel oil to smaller tanks that were located at various locations throughout the groves. Examples of these smaller tanks remain at the southeast corner of Dufferin Avenue and Myers Street, the southwest corner of Cleveland Avenue and McAllister Street, and on the southwest corner of Dufferin Avenue and St. Lewrence Street.

V. Conclusions

The Arlington Heights Citrus Grove Lendscape has changed in several important ways. The first is that now it is viewed within e city-wide context. As the last remaining example of citriculture in the city, it "belongs" to all of Riverside. Legislative initiatives that sought to shape its form were voted on within a city-wide context. As the development of the California State Citrus Heritage Park progresses, it may come to be viewed as "belonging" to all the people of California.

Secondly, today, this cultural landscape expresses peoples' values in a different way than at its inception and height. Arlington Heights no longer exists within the context of a rural landscape. It is surrounded by urbanization. It is no longer an unconscious expression of people's work, values, and lifestyle. This is e landscepe under intense scrutiny. Decisions defining its form and character are being consciously made.

The historic patterns of citriculture in Riverside can no longer exist without protection. In recent years, a conscious decision to provide this protection has been made. Public ownership seems to provide the best hope of preserving this landscape. And, as parts of Arlington Heights move out of private ownership to become a public trust, the landscape is viewed as a part of Riverside's heritage. This recognition will provide new challenges as to what changes will be deemed acceptable within the dynamics of this cultural landscape.

THE CITRUS LANDSCAPE: TECHNOLOGY

The technology of citrus agriculture, like much of agriculture or indeed any industry, is a combination of scientific experimentation, local knowledge and trial and error. Riverside very early on was e proponent of scientific approaches to cultivation, and local growers fought hard for an experimental station to be located here.[100] This was given e further boost by the arrival of G. Harold Powell, an USDA pomologist, who was greatly impressed by the scientific approach of many of the Riverside growers. Nevertheless, much of the technology of citrus cultivation is dependent on a great number of factors, not least the soil conditions, topography and climate, all of which combine to make local conditions of prime importance.

Layout of the groves

There are three main methods by which the planting of citrus trees is arranged in the groves: square or rectangular, triangular, and hexagonal. The square or rectangular method is the simplest and most common, and by 1913 was practical.[101] With this system the trees are planted so that the rows of trees intersect one another at right angles, and so cultivation may be carried out in two directions. The trees are often planted twenty feet apart, which allows 108 trees per acre, although this is close spacing. A more ideal spacing is 22 X 22 feet for Navel oranges, allowing 90 trees per acre, and 24 X 24 feet for Valencia oranges, for 76 trees per acre.[102] These are, however, arbitrary distances and much depends on local conditions. The ideal spacing includes enough distance to make pruning easy (preventing the trees from growing together and forming a canopy), while also maximizing the number of trees that can be planted per acre.[103]

With the triangular system the trees are set in rows so that the first tree in every second row is positioned halfway between the distance of two trees in the previous row. This arrangement allows more room for the trees and so less are planted per acre.[104]

The hexagonal system is the more economicel in terms of space, and more trees are planted per acre at a given distance apart than by any other system. The trees are set equidistant, six trees forming a hexagon with a seventh tree positioned in the center.[105]

Irrigation

Irrigation is fundamental for citrus cultivation in Southern California; the trees must never be wanting for water, and a reliable source is needed throughout the year. In Arlington Heights this need is edmirably fulfilled by the Gage Canal (see HAER No. CA-120), and where in 1894 the water was brought in by steel pipes from the canal to hydrants located on the highest point on the boundary of each lot. The water delivered to each plot was measured from the hydrant, end flowed through e wooden (redwood) flume laid along the highest line of the lot. One-inch diameter holes located half an inch from the bottom and spaced three to four feet epart were bored into the flume. Small sliding zinc plates were fixed over the holes in order to regulate the flow of water from each opening. When the grove owner was ready to irrigate, he plowed furrows from the opening in the flume, down between the rows of trees, to the lower end of his lot. Once the furrows had been made the hydrant was opened and water flowed through the flume towards its lower end. The flow of water from the flume to the furrows was regulated by raising or lowering the zinc plates. In this way the flow could be controlled to such a degree that "the little stream will require anywhere from 2 to 24 hours to reach the lower end of a furrow 40 rods long..."[106] The amount of water allocated to each five acre plot of land was one miner's inch, which is defined as:

> the volume of water discharged through a smooth opening one inch square in a board one inch thick, the surface of the water from which the flow is made being 4 inches ebove the center of the opening through which the water flows, and the space into which, or the surface upon which the flowing water is discharged, to present no obstruction above the bottom of the opening through which the flow is made. The amount of water discharged through such an opening in the manner indicated is about 9 gallons per minute.[107]

The weter, today, is still delivered to the groves in Arlington Heights in much the same way as described ebove, elthough the wooden flumes have been replaced by buried concrete pipelines and concrete standpipes (still using the metal slides to control the flow of water) discharge the water into the furrows.

The furrows generally run parallel to the lower end of the grove. Where the topography does not allow for this arrangement the slope is contoured, and "The great Arlington orchard of Riverside County...are examples of where this...method is practiced with entire satisfaction."[108] The number of furrows between the rows of trees varies depending on the size and age of the trees. In groves with small trees fewer furrows are used; where there are large trees set between 20 to 30 feet apart, from 5 to 9 furrows are used.[109] However many furrows are used, the soil must be properly tilled so that the water percolates down into the soil as it flows through the furrows.

Cultivation

Cultivetion begins in Februery when the winter cover crop is plowed under. The proper depth of plow is about 8 or 9 inches although in order to prevent plow-sole (a hard layer impervious to water) the soil is plowed to a different depth each year. Cultivation is then carried out throughout the year. This is generally done after each irrigation in order to create and maintain an effective soil mulch by stirring up the surfece layer of soil. In September the winter cover crop is sown.[110]

Before the turn of the century horses, mules and human muscle power was used for most of the cultivation work, but during the early part of the twentieth century mechanical traction was increasingly applied; "the tractor is gradually displacing the mule on large tracts of level land."[111] Many tools were needed for citrus cultivation and these included wagons, plows, harrows, cultivators, furrowers, subsoilers, drills, spraying outfits and many other miscellaneous tools.[112]

Fumigation

The control of citrus pests was formerly carried out by spraying, but the use of hydrocyanic gases in fumigation had by the 1910s "practically eliminated commercial spraying in the citrus orchards for injurious insects."[113] The control of fungal diseases, however, continued to be done by spraying using fungicides such as Bordeaux mixture and lime-sulphur.

Fumigetion was carried out by enclosing the trees in tents and filling them with hydrocyanic acid gas. The fumigation tents were generally octagonal (8-sided) in shape and varied in size depending on the size of the tree elthough most often 45-foot tents were adequate to meet all the requirements of a full grown orchard. These tents were made of a variety of materials, although army duck and drill of various weights were the most commonly used. The tents were dipped in a tannin bath in order to prevent molding and rotting. After dipping, the tents were marked with three one and a half- or two-inch parallel lines across the tent three feet apart. The size of the tree is determined by numbering eech foot across the tent, sterting from the middle, and numbering each way. From these measurements the amount of gas needed for each tree could be ascertained. A fumigating outfit normelly consisted of 30 or 40 tents with a team of five men.

The chemicals that made up the gas were brought to each tree by a chemical wagon. This vehicle carried a full supply of acid, cyanide and water. The sulphuric acid was kept in an earthenware or lead-lined container end was drawn off using a rubber siphon. A keg or barrel held the water and a tight box was deemed sufficient for the cyanide. Other equipment that made up the outfit were dosage schedules, graduates, clamps, rubber gloves, scales and sufficient light.[114]

The operation of fumigating began by two men pulling the tents over the trees. One man, called the taper, took the measurements and called them to another man who determined how much cyanide to use. This man also emptied the ecid generators (earthenware pots in which the chemicels ere placed) from the previous row which had just been fumigated and had them ready for the next row of trees. Meanwhile, the fifth man measured out the water and acid into the generators in the ratio of three fluid ounces of water and one fluid ounce of sulphuric acid to every ounce of potassium cyanide. The cyanide man then lifted the tent so that the last man could place the generators under the tree, without touching the tent (which would cause holes to be burnt into the tent). The cyanide was then added and the ensuing chemical reaction filled the tent with hydrocyanic acid gas. The gas was left in the tent for et least 45 minutes. A whole row of thirty tents could be dosed within about an hour. Fumigation was usually carried out during the winter or spring months and normally at night to avoid the heat of the sun. Fumigation was not carried out at temperatures higher than 70 degrees Fahrenheit or below 36 degrees Fahrenheit, as extremes of temperatures could cause severe burning of the fruit and foliage.[115] The development of alternative spray treatments eventually eliminated the use of tent fumigation.[116]

Frost Protection

During the winter months, frost can be extremely damaging to the citrus crop. Therefore, a method of orchard heating was needed to raise the temperature of the grove sufficiently to prevent damage. In Riverside in 1891, A. T. Copley first experimented with raising the temperature of his grove by burning tar and wood. He later settled on using coal in wire baskets. In 1897, the Riverside Horticultural Club began experiments in the use of orchard heaters or "smudge pots", using a variety of fuels, and within 5 years hed demonstrated their value.[117]

The burning of coal in baskets was successfully used before 1911, however, the heavy frost of the winter of 1911 had proved that oil smudge pots were preferable to coal baskets.[118] The first oil heater was introduced by Charles Froude, and was later improved by J. P. Bolton of Fresno, California.[119] The expense of coal, and the easier handling of oil led to the rapid adoption of oil orchard heaters after the winter of 1911, and "millions of oil pots [were] being purchased."[120]

Between 1911 and 1914 there was a great deal of experimentation in the development of heaters and subsequently a variety of different types were available. The ideal oil heater, however, should:

> provide good combustion and be as nearly smoke free as possible. It should be substential yet simple in construction and ample in capacity. The rate of combustion should be easily controlled and it is an advantage to have the parts nest well for storage. The covers must effectually prevent rainwater from entering. Eese of handling, filling, lighting, extinguishing, and efficiency of radiation are ell importent. The cost should be low, usually not above $1 each.[121]

Up until this date the idea of smudging was to give off as much smoke as possible so that the loss of heat from the earth by radiation would be reduced. This method, however, coated the trees and fruit with soot which had to be cleaned off by expensive washing. Therefore the trend increasingly moved towards smokeless oil heaters.[122]

Generally, one three-gallon or five-gallon heater was required for every tree, but the number varied depending on the size and variety of tree and the extent of the cold. The heaters were placed on the ground mid-way between the trees, but in line with the trees in one direction so as not to be in the way of wagons. By the use of these heaters it was possible to raise the temperature from 7 to 10 degrees for 7 to 10 hours. The heaters were left in the groves during the whole of winter.[123]

The crude oil for the heaters were generally stored in galvanized circular iron tanks, and on larger renches there was often a series of tanks interconnected by a system of pipelines:

> The Arlington Heights Fruit Company at Riverside has a main storage tank of 500,000 gallons capacity connected with a 6-inch pipe-line five and one-half miles long, which serves ten smaller tanks each 12,000 gallons capacity. At intervals through the orchard there ere "gooseneck" stand pipes from which the wagons may be filled.[124]

The oil was delivered to the heaters by tank wagons of about four or five hundred gallons capacity which had a valve at the rear from which five gallon buckets were filled. The heaters were filled from these buckets. The heaters were lit when the air temperature three feet above the ground was 30 degrees Fahrenheit for lemons, and 27 degrees Fahrenheit for oranges. Often, only alternate heaters would be lit, the others would remain in reserve in case they were needed later.[126]

In the 1950s the use of oil heaters gradually died out, they were replaced by electric fans which circulate the air to prevent the temperature from dropping below 30 degrees Fahrenheit. Smudge pots and the iron tanks used to store the crude oil, although no longer used, still remain in the landscape of Arlington Heights today.

Picking

In California oranges are harvested throughout the year, Navel oranges being harvested from November 1 to May 1 and Valencias are picked from June 1 to November 1. Before G. Harold Powell demonstrated the need for careful handling of fruit in his series of experiments undertaken in Riverside from 1904[128], fruit would often be picked by literally pulling them off the branches. This caused considerable injury to the delicate peel of the fruit and left it vulnerable to fungal attack. In order to prevent the damage of the delicate skins of the fruit, clippers were used, but care had to be taken when using clippers to prevent punctures from the stems of other fruit if cut too long, from fingernails, from thorns, gravel scratches and nails in the field boxes. Cloth picking bags were used to hold the oranges before they were put in field boxes. The field boxes were then placed onto a wagon which transported the fruit to the packing house.

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82.A field survey is recommended of the Arlington Heights landscape to locete and map all major features and characteristics, including remaining structures and buildings from the period of significance (1890 to World War II). This was not possible given the time and scope of HAER's summer 1991 project, but it is vital to the full documentation and description of the cultural landscape of this place. Representative examples are discussed throughout this study.

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THE CITRUS LANDSCAPE: TECHNOLOGY

Appendix

NUMBER OF TREES TO THE ACRE.
after Coit (1915)

DISTANCE APART	HEXAGONAL	SQUARE	TRIANGULAR
35 X 35 FEET	641	36	33
30 X 30 FEET	55	48	44
25 X 25 FEET	81	70	64
25 X 20 FEET		87	79
24 X 24 FEET	86	76	
22 X 22 FEET	103	90	
20 X 20 FEET	126	108	98
18 X 18 FEET	142	134	122
20 X 14 FEET		145	132

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